REMARKS

Claims 1-2 are pending in the present application. The Specification and claims 1-2 are herein amended. No new matter has been presented.

Information Disclosure Statement

The Examiner objected to the IDS because of the following informalities:

> The information disclosure statement filed 08 June 2006 fails to comply with 37 GER 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. Specifically English translations or explanations of the relevance has not been provided for cite numbers 7, 8, 10 and 12. It has been placed in the application file, but the information referred to therein regarding these references has not been considered. Additionally on this IDS cite numbers 1-6 have been lined through since they are identical to the cites on the IDS submitted on 17 June 2005, where they have been marked as considered.

Applicants herein submit a Supplemental Information Disclosure Statement. The submitted an explanation of relevance based on the description of background technology in the specification is as follow:

> JP46-5204 and JP62-091469 disclose known methods for producing a diamond sintered body with a sintering aid, for example, carbonate or metal, such as Co, by use of a conventional ultrahigh-pressure synthesizing apparatus.
>
> In Akaishi, "Synthesis of fine-grained polycrystalline diamond with carbonate as a sintering agent," Journal of the 41st High Pressure Symposium, p 108, the Japan Society of High Pressure Science and Technology (2000), the inventors reported a method for producing a fine-grain diamond sintered body, which comprises adding oxalic acid dihydrate serving as a source of a CO_2-H_2O fluid phase into carbonate to prepare a mixed powder, and applying a natural diamond powder having a

> grading range (distribution range of particle diameter) of zero to 1 μm, onto the mixed powder to form a layered structure. However, this production method essentially requires a high temperature of 2000°C or more.
>
> In Hosokawa et al., "Sintering behavior of diamond power with an average grain size of 50 nanometer under high pressure," Journal of the 42nd High Pressure Symposium, p 89, the Japan Society of High Pressure Science and Technology (2001), the inventors reported a method similar to the above method, which comprises sintering a finer-grain diamond powder, for example, having a grading range of zero to 0.1 μm. In this case, any high-hardness diamond sintered body could not be obtained due to occurrence of abnormal grain growth in diamond.

Cite Numbers 10 and 12 in the previously submitted SB08 form are explained in the present Specification.

Thus, this objection to the IDS should be withdrawn.

Rejections under 35 USC §112, Second Paragraph

Claims 1 and 2 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite because the term "a minute amount of non-diamond carbon" in claim 1 is a relative term which renders the claim indefinite.

The words "a minute amount of non-diamond carbon" in Claims 1 have been amended to --a non-diamond carbon formed by graphitization of part of diamond powder-- to overcome this objection. The amendment is supported in the original specification at page 4, lines 9-10. Thus, this rejection should be withdrawn.

Rejections under 35 USC §102(b)/103(a)

Claim 1 was rejected under 35 U.S.C. 102(b) as anticipated by Akaishi (M. Akaishi et al., "Synthesis of fine-grained polycrystalline diamond with carbonate as a sintering agent, 41st High Pressure Seminar (2000), The Japan Society of High Pressure Science and Technology, 2001, p.108) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Akaishi in view of Davies (WO 02/09909).

Claim 1 has been amended to recite, among other things, "wherein said diamond composite sintered body does not contain any sintering aid." The Examiner alleged as follows:

> Akaishi discloses a polycrystalline diamond made from a process substantially similar to that of the current invention, with the exception that Akaishi discloses that use of a sintering aid laminated onto the diamond powder before sintering. Specifically, Akaishi discloses enclosing diamond powder having a grain size of 0-0.5 μm (0-500 nm) in a Ta capsule which is then placed in a pressure transmitting medium (such as molten NaCl) and sintered at 7.7 GPa and 2200°C using a modified belt type apparatus (ultrahigh-pressure synthesizing apparatus). Based on the similarities between the process of the current invention and that of Akaishi it is assumed that the process of Akaishi is carried out at thermodynamically stable conditions.
>
> It appears that the product created by Akaishi would be the same as that produced by the current method, as it is not clear what, if any, difference the addition of a sintering aid would make on the final product since sintering aids are typically removed during the firing process.
>
> Additionally, while Akaishi discloses the use of natural diamond powder instead of synthetic as recited by the current claim, this should not have an effect on the final product produced since synthetic diamonds and natural diamonds are essentially identical (a diamond lattice crystal structure of carbon).

(Office Action, page 4, line 20 to page 5, line 13). However, as is clear from the title of Akaishi, the reference discusses synthesis of fine-grained polycrystalline diamond **with carbonate as a**

sintering agent." Also, Akaishi uses natural diamond powders of 0-1 μm as the starting diamond powders.

According to such a diamond sintered body production method using a sintering aid, material used as the sintering aid inevitably remains as a solid in a sintered body after the high-pressure/high-temperature sintering. Such remaining sintering aid causes decrease in bonding between diamond grains. As compared to an ideal diamond sintered body containing no sintering aid, diamond sintered body with the sintering aid has a lower hardness, and poor properties due to a chemical reaction between diamond and the sintering aid remaining in the sintered body.

Therefore, Akaishi does not teach or suggest "A heat-resistant diamond composite sintered body, comprising: a diamond crystal and a non-diamond carbon formed by graphitization of part of diamond powder, wherein said diamond composite sintered body does not contain any sintering aid, wherein said diamond composite sintered body is prepared by sintering an ultrafine-grain synthetic diamond powder having an average grain size of 200 nm or less, by use of an ultrahigh-pressure synthesizing apparatus through static compression process without using a sintering aid, said composite sintered body having a Vickers hardness of 85 GPa or more," as recited in claim 1.

Regarding Davies, the Examiner alleged as follows:

> Davies disclose a method of making a polycrystalline abrasive body, including a polycrystalline diamond body, by forming a compact of particles which are treated at high temperature and pressure to form the body. Specifically Davies disclose that the body may be made from diamond particles having a particle size as small as 0.1 μm (100 nm), and that this lower limit is imposed by the limitations of crushing, and not by

> the method of the invention (paragraph spanning pages 8-9). Davies further notes that in previous methods where a non-particle matter (i.e., sintering aid) is used it becomes difficult to leach out that matter as grain sizes and porosity decrease (page 1, 3rd paragraph). Davies discloses as a solution to this forming such a polycrystalline body free of second phases such as sintering aids (page 2 last paragraph - page 3 first paragraph).
>
> It would have been obvious to one skilled in the art, at the time of invention by applicant, to have modified the method of Akaishi by not using a sintering aid as taught by Davies. This would have been obvious because Davies discloses that such a process is possible, and removes the need to later leach the second phase out of the body.

(Office Action, page 6, lines 1-16). In Example 1 of Davies, synthetic diamond crystals of a particle range of 3 to 5 microns is placed in a titanium metal canister and the canister is heated and pressurized in a temperature about 1200 °C and a pressure of about 5GPa. In Example 2 of Davies, diamond crystals of a particle range of 0.5 to 1 microns is placed in a titanium metal canister and the canister is heated and pressurized.

Thus, in Davies, the temperature and the pressure are much lower than those utilized in the process of the present invention (temperature of 2100 °C or higher and a pressure of about 7.7 GPa or higher). Under such conditions, it is clear for a person having ordinary skill in the art that the "self-bonded" strength of the diamond particles is very low compared with the diamond composite sintered body of the present invention. Therefore, Vickers hardness of 85 GPa or more is not obtained. These can be confirmed from the results of Comparative Example 1 described at page 8, lines 5-8 in the present specification.

Therefore, even if Akaishi and Davies are combined there is no reason for a person having ordinary skill in the art to arrive at "A heat-resistant diamond composite sintered body, comprising: a diamond crystal and a non-diamond carbon formed by graphitization of part of

diamond powder, wherein said diamond composite **sintered body does not contain any sintering aid**, wherein said diamond composite sintered body is prepared by sintering an ultrafine-grain synthetic diamond powder having an average grain size of 200 nm or less, by use of an ultrahigh-pressure synthesizing apparatus through static compression process without using a sintering aid, said composite sintered body having a **Vickers hardness of 85 GPa or more**."

For at least these reasons, claim 1 patentably distinguishes over Akaishi and Davies.

Rejections under 35 USC §103(a)

Claim 2 was rejected under 35 U.S.C. 103(a) as obvious over Akaishi.

As discussed above, Akaishi discusses synthesis of fine-grained polycrystalline diamond with carbonate as a sintering agent. Akaishi does not teach or suggest, among other things, "enclosing a synthetic diamond powder with no sintering aid in a capsule, said synthetic diamond powder having an average grain size of 200 nm or less."

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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